

Borehole

# 51-02-09

Log Event A

## Borehole Information

Farm : <u>TX</u>	Tank : <u>TX-102</u>	Site Number : <u>299-W15-142</u>
N-Coord : <u>41,646</u>	W-Coord : <u>75,897</u>	TOC Elevation : <u>671.38</u>
Water Level, ft :	Date Drilled : <u>7/31/1971</u>	

## Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>97</u>	

## Borehole Notes:

This borehole was drilled in July 1971 and completed to a depth of 100.5 ft. The drilling log does not mention casing perforations or grout. The top of the borehole casing is even with the ground surface. The SGLS was able to reach a depth of 97 ft.

The casing thickness is presumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. steel tubing.

## Equipment Information

Logging System : <u>1</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>10/1995</u>	Calibration Reference : <u>GJPO-HAN-3</u>	Logging Procedure : <u>P-GJPO-1783</u>

## Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>1/19/1996</u>	Logging Engineer: <u>Gary Lekvold</u>
Start Depth, ft.: <u>97.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>45.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>1/22/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>46.5</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>3</u>	Log Run Date : <u>1/22/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>58.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>42.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



Spectral Gamma-Ray Borehole  
Log Data Report

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### Analysis Information

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Analyst : E.P. Baumgartner

Data Processing Reference : P-GJPO-1787

Analysis Date : 9/9/1996

#### Analysis Notes :

Three logging runs were required to complete the SGLS logging of borehole 51-02-09. Logging run 3 repeated a segment of the borehole and was run as a quality assurance check of the SGLS. The field verification spectra recorded immediately before and after the survey operation met the acceptance criteria established for the peak shape and system efficiency, confirming the SGLS system was operating within specifications. The energy calibration and peak-shape calibration from these verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for 0.280-in.-thick casing was used in the calculation of radionuclide concentrations.

A depth overlap, where data were collected by separate logging runs over the same depth interval, occurred in this borehole between the depths of 45.5 and 46.5 ft. In addition, the segment of the borehole between depths of 42 and 58 ft was relogged to demonstrate the repeatability of the measured radionuclide concentrations. The concentrations of the natural radionuclides were calculated using both the original and repeated log data sets at overlapping points. The calculated concentrations using the separate data sets were within the statistical uncertainty of the measurements, indicating very good repeatability of the radionuclide concentration measurements.

Cs-137 was the only man-made radionuclide detected in this borehole. Cs-137 was detected semicontinuously from the surface to 35 ft and at the bottom of the borehole. From the surface to 6 ft is a zone of higher concentrations with a peak value of about 42 pCi/g at 5 ft. All other concentration values were at or less than 1 pCi/g. Cs-137 was not detected between 35 and 97.5 ft in this borehole.

The K-40 concentration log has a sharp increase at 49.5 ft from a mean of about 12 pCi/g to a mean of about 19 pCi/g. The Th-232 log plot also has a slight increase in mean value at this depth.

The SGLS total count log plot reflects the log plots of the natural radionuclide concentrations and the contribution of the Cs-137 concentrations. There is a slight drop in the total count plot at 91.5 ft. There is a sharp spike in the data (1135 cps) at 4.5 ft that reflects the Cs-137 activity at about this depth.

Details regarding the interpretation of the data for this borehole are presented in the TSDRs for tanks TX-102 and TX-103.

#### Log Plot Notes:

Separate log plots show the man-made (Cs-137) and the naturally occurring radionuclides (KUT). The natural radionuclides can be used for lithologic interpretations. The headings of these plots identify the energy peak for the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainty for the calculated concentrations at the 95-percent confidence level. The MDL is shown by open circles on the plots. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made radionuclides, the naturally occurring radionuclides, the total gamma



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count derived from the SGLS, and the Tank Farm gross gamma log. The gross gamma plot displays the latest available digital data with no attempt to adjust the depths to coincide with the SGLS data.

A separate plot is included that compares the measured concentrations of the naturally occurring radionuclides over the rerun or repeated log interval. The radionuclide concentrations shown were calculated using the separate data sets provided by the original and rerun logging runs.